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Assessing scholarly communication and research data training needs

Megan Bresnahan

University of Colorado Boulder, Megan.Bresnahan@Colorado.EDU

Andrew Johnson

University of Colorado Boulder, andrew.m.johnson@colorado.edu

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Introduction

As a result of technological and cultural shifts creating rapid changes in how scholarly research is conducted and communicated, many academic libraries now provide new services, including open access publishing support and data management plan consulting, to meet an increasingly diverse set of researchers' information needs (Association of Research Libraries, 2012; Blue Ribbon Task Force on Sustainable Digital Preservation and Access, 2008; Mercer, 2011; Tenopir et al., 2012). Some libraries have created positions or departments to provide these services, and several library and information science graduate programs provide new professionals with some of the skills (e.g., data curation) needed to engage in new forms of research and scholarly communication support (Creamer et al., 2012; Hswe and Holt, 2013; Choi and Rasmussen, 2009). However, in the present era of shrinking budgets, many libraries cannot afford to create the number of new positions required to provide this type of support effectively. These economic concerns may force libraries to look to internal training as a cost-effective and agile solution to re-skill current professionals, but it is unclear how to prioritize the investment of time and resources for training in a systematic and data-driven manner. Librarians may require training on topics such as data management and curation, open access issues, the grant process, and funder compliance (Tenopir et al., 2012). This paper describes efforts to identify and prioritize local areas of need at the University of Colorado Boulder Libraries (CU Libraries) as a first step in developing customizable training workshops and materials for training and re-skilling librarians to support a variety of researchers' information needs.

Drawing upon training needs assessment principles, the authors conducted an assessment related to the training needs and skills of subject librarians at the University of Colorado Boulder in August of 2012. The authors evaluated training needs specifically related to emerging research support roles in libraries related to scholarly communication and research data services. The study methods provided a way for the individuals who will participate in training to influence the design of the prioritization process. By collecting this input, the authors will create a tailored training program and hope that participants will be more receptive and engaged in the resulting training. The following questions guided the needs assessment: What training areas related to scholarly communication and research data issues do subject librarians think are important, both currently and in the future; what knowledge and expertise do subject librarians already possess related to these issues; what are subject librarians' levels of comfort or anxiety surrounding these issues. Information gathered in response to these questions can be used to inform the design of effective training opportunities for subject librarians.

The outcomes of this research provide a model for other institutions seeking to develop training agendas for librarians, who must engage in new forms of research and scholarly communication support. A toolkit for conducting a local needs assessment is available for any library wishing to replicate this needs assessment process [appendix 1].

Literature Review

New Types of Research Needs and the Role of the Librarian

As a result of advances in technology, information processing, and new models of publication, research is now conducted, communicated, and reused in increasingly complex and rapidly changing ways. Opportunities for connecting the final output of research, in the form of a published article, with other important parts of the research process, such as raw data, analyzed data, applied algorithms for statistical analysis, metadata, and documentation, are vast and change the scale and scope of how research is disseminated and connected (Ball, 2012; National Science Foundation, 2011). In tandem with this expanded research integration, new models of publication and dissemination of research, such as open access publishing and self-archiving, have allowed for greater access to research findings and facilitated the replication and reuse of research findings and data (Association of Research Libraries, 2012; Oppenheim, 2008).

Researcher needs drive the types of support libraries must provide. Traditionally, libraries have played a direct role in providing collections to support research activities, as well as information literacy education and search strategy consultation. As technologies have changed how researchers interface with the physical and virtual library collection, this traditional role has expanded. During recent years, e-Science initiatives, data sharing requirements, open access policies, and new methods of dissemination of research findings have changed the ways that libraries provide support for researchers' needs, and the role of the subject librarian is in a state of significant transformation (Association of Research Libraries, 2012; Auckland, 2012; Bracke, 2011; Buehler and Boateng, 2005; Horwood et al., 2004; Hswe and Holt, 2013; Tenopir et al., 2012). A number of reports have indicated that this professional shift requires librarians to develop new skills and areas of expertise (Auckland, 2012; Blue Ribbon Task Force on Sustainable Digital Preservation and Access, 2008; National Science Foundation, 2011; Tenopir et al., 2012). A recent report on research data services (RDS) in academic libraries found that the most common method for addressing research data needs on campuses was to reassign current library staff to fill new RDS roles (Tenopir et al., 2012). This trend means that many librarians, who do not necessarily have direct experience or training in these new areas of research support, will need both external and internal training opportunities to appropriately meet the challenges and demands of their new or evolving positions (Auckland, 2012; Tenopir et al., 2012). In addition, many successful models for library support of new campus research initiatives involve not only repository and research data management staff but also collaborations with subject librarians, who already have established relationships with their department faculty and students but may not be obvious targets for training opportunities (Auckland, 2012).

Internal Needs, Assessment, and Training

Due to the rapidly changing needs of the library profession, internal training programs in libraries are common in many areas of professional development, especially in libraries that do not have the resources to send librarians and library staff to external professional development

events (Merrill and Lindsay, 2009). Library administrators should recognize the need to re-skill librarians as the profession evolves (Callahan and Watson, 1995). Internal training initiatives in libraries vary greatly in scale and scope. Some representative training themes detailed in the literature include technology, e-science, e-learning, and leadership skills in libraries (Creamer et al., 2012; Mathews, 1997; Merrill and Lindsay, 2009; Pegrum and Kiel, 2011). However, just as the lack of resources in some libraries may prohibit costly external training activities, these same environments necessitate careful decision-making about where to invest available resources internally. Library administrators may want to assess local training needs within their libraries, so that resources are invested wisely, and training is effective, useful, and efficient.

Training needs assessment provides critical information for designing and evaluating a training program (Goldstein and Ford, 2002). There is a long-standing tradition of assessing training needs in academic libraries dating back to at least the 1970s (Simpson, 1978). Training needs assessments have been used in a variety of types of libraries for a number of purposes (Creamer et al., 2012; Dunn et al., 2006; Schrader et al., 2012; Simons and Richardson, 2012; Urquhart et al., 2005). A review of several needs assessment studies in health science libraries from 1999-2004 examined the training needs of health science library staff in the United Kingdom and identified common trends in skill gaps related to information retrieval and knowledge management (Urquhart et al., 2005). In 2006, Dunn et al. conducted a discussion-based needs assessment, which resulted in the development of a “mini-medical school” training for librarians (2006). Another needs assessment conducted at the University of Saskatchewan used survey results to identify skill gaps related to the research knowledge of academic librarians and their preparedness for participating in academic scholarship and tenure (Schrader et al., 2012). Most recently, a needs assessment survey distributed to institutional repository staff in Australia and New Zealand revealed gaps in formal training and coursework related to the job duties of these staff members and identified a need for continued professional development (Simons and Richardson, 2012).

Training needs assessments not only aid in the identification of skill and knowledge gaps in academic libraries but will also contribute to the evidence-based development of training interventions. A variety of factors may influence the design and content of a training needs assessment, including appraisal of current skills, anticipated training needs, and training priorities in the context of the overall mission of the library and campus, which may be either reactive or proactive (Parry, 1991). Needs assessments can solicit feedback from stakeholders related to training format, design, timing, and methods. Creth (1989) describes a methodology for planning for staff development that involves asking staff and their supervisors to create lists of knowledge and skills needed for various library jobs that can be used to rank competencies in terms of need for training. A needs assessment study of instructional development skills of librarians in 2002 revealed the value of involving librarians in the selection of training topics and skill levels, because the resulting training program reflected the specific preferences of the

intended participants (Ware, 2002). The importance of involving stakeholders in the design of training is documented in the library training needs assessment literature (Jerabek and McMain, 2002; Ware, 2002). In addition, methodologies like participatory design posit that stakeholders are more receptive to services when their opinions and feedback are taken into account during the design process (Foster and Gibbons, 2005; Spinuzzi, 2005). Involving stakeholders in the design of a training program provides a practical understanding of how training can be most impactful and useful for participants.

Methods

Background

Recent campus and library administrative priorities at the University of Colorado Boulder stress the importance of creating new services and adapting research environments to meet researchers' data management and scholarly communication needs (Vice Chancellor for Research's Data Management Task Force, 2012; University of Colorado Boulder Libraries, 2010). In the summer of 2012, an interdepartmental committee called the Scholarly Communications Working Group was formed within the CU Libraries in order to centralize and formalize efforts around scholarly communication issues that were previously done in an ad hoc manner. In recognition of the need to raise awareness of and develop new skills related to these issues, the Scholarly Communications Working Group was charged with developing an internal training program to support librarians in developing skills and expertise in new areas of research support related to scholarly communications and research data. Since the scope of the working group includes everything from open access and research data management to copyright, it was necessary to develop a method of determining which issues to prioritize and how to best address training needs in an environment with limited resources and staff time for professional development.

Survey Design

The authors developed a survey instrument for collecting data from potential trainees that could inform decisions regarding training priorities and formats [Appendix 2]. This instrument is in line with the questionnaire methodology for training needs assessment described in the literature (Conroy, 1978; Creth, 1989; Goldstein and Ford, 2002; Rossett, 1987). The charge of the Scholarly Communications Working Group is quite broad; it tasks the group with creating infrastructure, services, and training opportunities for librarians related to a range of scholarly communications and research data issues. With such an expansive charge and limited resources, the authors set out to use the survey to develop a training program that would be efficient and user-focused. Librarians had received some training on scholarly communications and research data topics, especially open access, but there was little evidence that this initial training had been useful or helpful enough that librarians were comfortable applying training in practice. The authors also expected that anxiety may be as much of a barrier as lack of knowledge to the implementation of new services within liaison work and decided to assess these factors along with perceived relevance of topics to each subject librarian's job. The survey was sent via email

to all subject specialist librarians at the University of Colorado Boulder in the summer of 2012 (25 subject librarians total). The instrument consisted of eleven questions, including two demographic questions (Questions 1 and 2). Five questions were designed to provide a means of prioritizing training needs for a number of topics culled from the working group's charge (Questions 3 through 7). The list of training topics used in the survey included "author rights", "copyright", "data analysis and manipulation", "data citation", "data lifecycles", "data management plan consultation", "data sharing", "data preservation", "finding data", "funder mandates and policies", "institutional and disciplinary repositories", "metadata and data description", and "open access" (Figure 1).

INSERT [Figure 1. Sample survey question]

Survey questions related to the prioritization of training topics sought to address the following issues:

1. What should the institution (CU Libraries) be doing?
2. What is not being done at the institution?
3. Why is the institution not doing what should be done?

These issues echo questions that Conroy (1978) identified as important for staff development planning to address (e.g., what is the current situation? what is the desired situation? what should happen next?). As Figure 2 shows, to address what the CU Libraries should be doing with regard to the training topics (Issue 1), the authors asked participants to indicate how important each topic is to their job now and how important it will be in five years (Questions 3 and 4). To address what is not currently being done at the CU Libraries (Issue 2), the authors asked participants to indicate whether or not they currently interact with researchers about each topic (Question 6). Finally, to understand why the CU Libraries are not addressing some training topics (Issue 3), the authors asked participants if they are able to explain the main issues around each topic as well as how comfortable they would feel discussing each topic with a researcher (Questions 5 and 7). These questions align with several of the broad questions training needs assessments should attempt to answer according to the literature (e.g., what is the optimal situation? what are employees currently doing? how do employees feel about the topics? what is causing the situation to be less than optimal?) (Rossett, 1987).

INSERT [Figure 2. Approach to training needs assessment]

The authors designed the remaining four questions to gather additional contextual information and preferences for training formats (Questions 8 through 11). In this process, participants described any specific concerns they have related to the survey topics and provided actual examples of interactions they have had with researchers. The authors also asked participants to indicate which formats they would find most useful for training (e.g., presentations, online

tutorials, workshops, etc.). The importance of this last step of gathering information about preferred training solutions is also emphasized in the training needs assessment literature (Rossett, 1987).

As mentioned, question topics were developed based on the goals and objectives listed in the charge of the Scholarly Communications Working Group. The authors were interested in a number of issues related to how subject librarians are interacting with and supporting researchers in the topic areas, and how these interactions are influenced not only by expertise, but also perceptions of relevance and anxiety associated with these issues. Once designed, the survey was tested and reviewed by two colleagues in the library with experience in assessment design.

Analysis

To create a single overall training need score for each topic, the authors analyzed the data gathered from the survey questions 3-7 described in the previous section. Responses to questions 3 and 4, which concerned relevance now and in five years, and questions 5 and 7, which related to knowledge and anxiety levels, were scored using a five-point Likert scale from -2 (“Strongly Disagree”) to 2 (“Strongly Agree”). Responses to question 6, which related to what participants already do as part of their jobs, were scored either -1 (“Yes”) or 1 (“No”). Topics scored highly in terms of training prioritization if participants rated the topic as relevant to their jobs, if participants were not already interacting with researchers about the topic as part of their jobs, if participants lacked knowledge about the topic, and if participants felt anxious about the topic. The scores for these five questions were then added together to give the overall training need score for the topic. The scores for each topic were then compared to create a ranked list of training priorities.

Figure 3 provides an example of the scoring process for one topic, “Data Sharing”. In response to question 3 for this topic, 4 participants “strongly agreed” that data sharing is relevant to their jobs now, 7 “agreed”, 0 were “neutral”, 7 “disagreed”, and 0 “strongly disagreed”. These responses were then multiplied by the appropriate weight assigned to the Likert scale (“strongly agree” = 2, “agree” = 1, “neutral” = 0, “disagree” = -1, “strongly disagree” = -2) and added together for a total score of 11 for current relevance related to “Data Sharing”. This process was repeated for questions 4-7 resulting in total scores of 22 for relevance in five years (question 4), 11 for not currently interacting with researchers (question 6), 2 for lack of knowledge (question 5), and 8 for anxiety (question 7). The total scores for each question were then added together to create an overall score of 54 for “Data Sharing”, which placed this topic near the top of the training prioritization ranking.

INSERT [Figure 3: Example overall indicator of training need scoring rubric for “Data Sharing”]

In addition, the authors looked at the results for each of the five questions separately to provide additional context for the overall ranked list of training prioritization. For example, analyzing the

questions about relevance in isolation revealed that participants considered all topics, even those at the bottom of the ranked list, as relevant to their jobs both now and in the near future. This result meant that the “relevance” questions were not particularly useful for understanding how training can be prioritized.

After generating the ranked list of training priorities, the authors used responses to the remaining questions to determine the types of training opportunities and formats participants would find most useful. The authors also analyzed qualitative data from responses to two open-ended questions regarding participants’ past experiences and concerns to identify themes common to multiple responses. This analysis provided a more detailed picture of how to proceed with the design of a training program that will address priorities in a manner suited to the particular needs and preferences of the trainee population.

Results

Of the 25 subject specialist librarians contacted, 20 responded to the online survey. Nearly two-thirds of participants (13) indicated professional experience of greater than six years, while seven participants reported zero to five years of experience as a librarian. Figure 4 shows the overall indicator of training need for all of the topics included in the survey. “Data Lifecycles” and “Data Analysis and Manipulation” scored highest, with “Data Sharing,” “Metadata and Data Documentation,” “Data Preservation,” “Data Management Plans,” and “Data Citation” also scoring above the mean for all topics (40.38). “Open Access” and “Institutional Repositories” were the lowest ranked topics. “Finding Data,” “Funder Mandates,” “Author’s Rights,” and “Copyright” also scored below the mean.

INSERT [Figure 4. Overall training prioritization scores]

Figure 5 shows the scores for the two questions concerning relevance to participants’ jobs now and in five years. All topics received positive scores indicating that participants felt all topics are, and will continue to be, relevant to their jobs. In addition, every topic had a higher score for relevance in five years than for current relevance, which suggests that all of the topics will be more important to participants’ jobs in the near future than in the present. In contrast to the overall training prioritization scores, “Open Access” and “Copyright” scored highest on both current relevance and relevance in five years. There was a wider range of scores for current relevance (3-24) than for relevance in five years (21-30) suggesting that many of the topics that scored relatively low on current relevance will become increasingly important in five years.

INSERT [Figure 5. Scores for relevance to participants’ jobs now and in five years]

Responses to questions concerning lack of knowledge and anxiety for each of the survey topics are shown in Figure 6. There were negative scores for both lack of knowledge and anxiety,

meaning that participants disagreed or strongly disagreed when asked if they lacked knowledge or were anxious about each topic. This finding suggests that participants are comfortable and/or knowledgeable with at least some of the survey topics. While there was a very high correlation between anxiety and lack of knowledge (0.93), anxiety scores were higher than scores for lack of knowledge for every topic. There were fairly wide ranges of scores for both questions. Anxiety scores ranged from -11 (least anxious) to 10 (most anxious), while lack of knowledge scores ranged from -18 (most knowledgeable) to 6 (least knowledgeable). As seen in the overall prioritization scores, many of the data-related topics (e.g., “Data Lifecycles,” “Data Analysis,” “Data Management Plans,” and “Data Sharing”) scored near the top in terms of both high anxiety and high lack of knowledge, while topics like “Open Access” and “Institutional Repositories” scored the lowest.

INSERT [Figure 6. Scores for participants’ lack of knowledge and anxiety levels concerning survey topics]

Survey participants were also asked if they currently interact with researchers about the survey topics as part of their jobs. Figure 7 shows the total number of “yes” responses to this question for each of the topics included in the survey. Participants indicated that topics like “Open Access” and “Copyright” are the most commonly included among current job duties. With the lone exception of “Finding Data”, far fewer participants reported that they currently interact with researchers about each of the data-related topics.

INSERT [Figure 7. Frequency of topics currently being done by participants]

When asked about training formats, participants expressed preferences for one-day workshops (74%), panels/presentations (68%), print handouts/guides (63%), and informal discussions (63%). Less than half of participants indicated preferences for online tutorials (47%), one-on-one consultations (42%), webinars (32%), and multi-day workshops (26%).

In addition to the survey questions that the authors used to rank training priorities and determine preferences for training formats, participants were asked to provide open-ended responses to questions about past experience and concerns with the survey topics. In their responses, participants described actual experiences they have had with the survey topics, which covered a variety of activities primarily related to open access, copyright, and both institutional and disciplinary repositories. All data-related examples concerned finding or using data rather than assisting researchers with their own data.

Several common concerns emerged from participants’ responses. Participants indicated a need for practical, hands-on training. As one participant noted, “we need training now and we need it [to be] ongoing.” Another participant expressed specific interest in having a “cheat sheet” or “handout” with talking points about each topic, including topics with which this participant

already felt comfortable. Other participants wanted to know more about tools and resources on campus to which they could direct researchers.

Participants also expressed concerns about how best to provide outreach to researchers with regard to the survey topics. One participant indicated a need for “practice talking about the issue[s] within the Libraries and to researchers.” Other participants felt that researchers would perceive librarians as “unwelcome” when interacting with them about many of the survey topics and that it would be difficult to engage with researchers who are not already interested in these topics.

Several participants worried that the disciplinary differences among researchers would prove challenging. Also, participants felt that they would need a deep understanding of the discipline and specific skills in order to assist with some of the survey topics, such as data analysis. With regard to both disciplinary differences and the “depth of knowledge” required for all of the survey topics, participants felt that a team approach would be necessary.

Discussion

Overall Training Prioritization

The methodology used in this needs assessment allowed the authors to evaluate gaps in skills and develop a plan for training, which takes into account potential trainees’ opinions of relevance, current knowledge or lack thereof, feelings of anxiety and comfort, and preferences for training formats. This training needs assessment methodology also provides information that can be used when justifying requests to administrators for resources needed to provide actual training and will improve the library’s ability to invest its resources with maximum impact.

For the purposes of this discussion, survey topics are grouped into two categories: data topics, which include “data analysis/manipulation”, “data citation”, “data lifecycle”, “data management plan consultation”, “data sharing”, “data preservation”, “finding data”, and “metadata/data documentation”, and scholarly communication topics, which include “author rights”, “copyright”, “funder mandates and policies”, “institutional/disciplinary repositories”, and “open access”. These two groups were not only distinguished by similar content categories but also by the overall prioritization ranking, with all of the data topics scoring higher than the scholarly communication topics. These findings indicate that the majority of training efforts at the CU Libraries should focus on topics related to data issues.

The division between data topics and scholarly communication topics can be attributed to multiple factors. Participants tended to indicate having less knowledge, comfort, and experience with data topics than with scholarly communication topics. In addition, participants found data topics to be slightly less relevant. Also, several months before this survey was distributed, the authors conducted a training session for librarians related to several of the scholarly

communication topics. This session was not assessed and its impact on the results of this study are unclear; however, it is possible that this session may have increased knowledge and decreased anxiety associated with some or all of the scholarly communication topics. Another factor that could account for the groupings is that the scholarly communication topics can be easily related to established roles in librarianship and may seem more approachable to librarians. Even “finding data”, the data topic that scored closest to the scholarly communication topics and lowest in the overall prioritization ranking among the data topics, is also closely related to more traditional liaison librarian roles, such as assisting researchers with finding scholarly articles. In contrast, less professionally entrenched topics, like data analysis and data sharing, rose to the top of the prioritization ranking.

Relevance to Job

The survey responses revealed that librarians consider all of the topics included in this needs assessment to be relevant to their profession. All topics scored highly, relative to other questions, in terms of current job relevance. The scores were even higher when participants rated topics for relevance in five years. This finding mirrors a growing professional trend of expanding traditional liaison librarian roles, which have primarily involved helping researchers find and access scholarly resources, to now include increased involvement in the creation of research data and scholarship. The high relevance scores indicate that training could serve both as a reactive response to current challenges facing librarians and as a proactive response to future needs.

Despite the data topics placing at the top of the overall training prioritization ranking, these topics placed near the bottom for both job relevance questions. In other words, while participants indicated that data topics are relevant to their jobs, they rated scholarly communication topics, like “open access” and “copyright”, as even more relevant. However, the scholarly communication topics placed at the bottom of the overall training prioritization ranking. This discrepancy between job relevance scores and the overall prioritization ranking may be a result of the fact that the scholarly communication topics have been part of the professional conversation in librarianship for most of the past decade, while trends in research data services in libraries have appeared more recently. Librarians may have had more opportunities and time to develop skills in areas of scholarly communication and may consider these skill areas to be more established in professional roles.

Anxiety and Lack of Knowledge

Participants were more knowledgeable and comfortable with established scholarly communication roles, and less knowledgeable and comfortable with issues related to the data topics. In addition, levels of both anxiety and lack of knowledge were more or less consistent with the overall prioritization rankings, but anxiety scores were consistently higher comparatively, revealing that feelings of intimidation or anxiety are an even larger barrier to adapting to new roles in librarianship than lack of knowledge. Anxiety appeared to be a particular issue for the data topics and will inform the subsequent design of trainings, as it

revealed that participants need training that is hands-on, practical, and can be directly applied to their work in order to reduce anxiety.

Not Currently Interacting with Researchers

Many of the data topics, which scored highly in the overall prioritization rankings as well as in terms of anxiety and lack of knowledge, are topics that participants are not currently doing as part of their job. This result is also represented in the responses to one of the open-ended questions, which asked participants to provide actual examples of experience with the survey topics. Participants indicated that they had only engaged in activities related to “open access”, “author rights”, “copyright”, and “institutional and disciplinary repositories”. The authors are conflicted about the meaning of this result, as well as the value of examining what librarians are already doing as part of their jobs. Simply knowing that librarians are not providing services related to these topics does not explain why this is so. This lack of activity may be related to anxiety or knowledge, or alternatively, to a lack of demand or infrastructure for providing these services. Further, if participants answered in the positive, indicating that they are engaged in activities around these topics, this response does not necessarily signify a diminished need for training in these areas. As a result, this factor was weighted slightly less than others (e.g., relevance, lack of knowledge, anxiety) during the scoring process for the survey data analysis.

Training Preferences

Results from the question regarding training format preferences revealed a clear need for practical tools that could be applied to local and disciplinary contexts, particularly with regard to interacting with researchers about these issues. Participants preferred one-day workshops, panel sessions, practical handouts, and informal discussions. Results, and associated comments, indicated that people wanted to practice skills and interact with other librarians around topics that scored highly in terms of training prioritization. Thus, understanding individual roles and expertise will be an important component of training. These responses provide valuable information for creating a highly customized training agenda to meet the goals of its participants.

The training needs assessment approach promotes engagement of trainees in the training prioritization and development process and may lead to high levels of receptivity to training opportunities that arise. Prior to conducting this assessment, the authors hoped that training materials and tools would include content repurposed or reused from other institutions, such as existing web tutorials and other online content, due to resource and time limitations. However, this desire did not fit with the preferences or needs of participants. Customizing and localizing training content will require a significant amount of staff and trainer investment; however, the resulting training will be more valuable and impactful if it suits local needs.

Limitations

Although the advantages of basing training priorities on the feedback of potential trainees are numerous, there are several limitations to such an approach as well. First and foremost, training

priorities often involve factors beyond the scope of this training needs assessment methodology. Such factors could include high-level directives from library, campus, or government administration. While data from potential trainees can be used to justify training priorities to administrators at various levels, this could prove difficult if the priorities conflict with campus-wide initiatives, for example.

This methodology also presupposes a list of potential training topics. In the authors' case, this list was determined by their working group's charge; however, such a list might not be as easy to generate for other institutions. Because of time and resource constraints, the authors also did not have the means to do a larger pilot of the survey in its design stage. Testing for bias and validity would have benefited the findings further. In addition, this methodology only takes into account the viewpoint of the librarians being trained, not the researchers or other stakeholders that libraries serve. While data from a training needs assessment can provide a solid basis for developing an internal training agenda, the needs of the researchers that this type of initiative aims to support should be taken into consideration as well.

Future Directions

Data from this training needs assessment will be used to develop a customized training agenda, which will be tailored to the preferences of subject specialist librarians at the CU Libraries. Training will be prioritized based on the training need scores from the survey. As the overall prioritization ranking indicates, initial training efforts will focus on data topics and will involve the formats most participants preferred, including one-day workshops, panels/presentations, print handouts, and informal discussions. Efforts will also be made to address specific concerns participants raised, including disciplinary differences in helping researchers, general assistance with outreach to researchers and others, and approaches to advocating for institutional support. All training efforts will be assessed in order to determine the effectiveness of the initial interventions and inform the next steps in this iterative training agenda.

Conclusions

As the results described in this paper demonstrate, this approach to training needs assessment can be used to identify and prioritize training for a variety of topics relevant to library staff. In this study, needs related to scholarly communication and research data services were assessed. The authors now have a clearer picture, based on participant feedback, of what training is needed in these areas of librarianship and how to best structure that training. Although participants viewed all topics as relevant and important, findings revealed that data topics should be a training priority for the CU Libraries. Further, results indicated a clear desire for practical training opportunities, through which librarians can develop tangible skills that are directly applicable to their individual outreach activities. Ultimately, this analysis and the resulting training agenda, may improve librarians' ability and desire to fully support their researchers in new and emerging areas of librarianship. While this particular assessment focused on issues pertaining to scholarly

communication and research data in academic libraries, a similar methodology could be used to assess different areas of training need at other types of institutions.

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Appendices

INSERT [Appendix 1: Toolkit for Conducting a Local Needs Assessment]

INSERT [Appendix 2: Survey Instrument]